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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,348	12/07/2000	Yen Choo	674538-2001	1675

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Susan K. Lehnhardt, Ph.D., Esq.
c/o Frommer Lawrence & Haug LLP
745 Fifth Avenue
New York, NY 10151

EXAMINER

COLLINS, CYNTHIA E

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 10/23/2002

19

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/732,348

Applicant(s)

CHOO ET AL.

Examin r

Cynthia Collins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-6,9,16 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,8,10-15 and 17-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8,9,11,13,14 6) ☐ Other: _____

DETAILED ACTION***Election/Restrictions***

Applicant's election with traverse of Group III, claims 15 and 22, and linking claims 7-8, 10-14 and 17-21 in Paper No. 18 is acknowledged. The traversal is on the ground(s) that it is improper to restrict Groups I-IV because the inventions must be both independent and distinct, on the ground(s) that it is improper to restrict Groups I-II and III-IV because the methods can be used together, on the ground(s) that it is improper to restrict Groups I-IV because they do not have different effects or different modes of operation, and on the ground(s) that a search of Groups I-IV would be coextensive as all four inventions relate to engineered zinc finger polypeptides such that a search of Groups I-IV would not pose an undue burden. This is not found persuasive because an application may properly be required to be restricted to one of two or more claimed inventions if they are either independent *or* distinct (MPEP § 803). This is also not found persuasive because the claimed methods are not used together. Additionally, this is not found persuasive because the transcriptional activator domain of Groups I and III and the transcriptional repressor domain of Groups II and IV have different effects in that they activate or repress transcription respectively, and have different modes of operation in that they require the presence and use of different polypeptides and polynucleotides for operation. Finally, this is not found persuasive because while the search of Group III may overlap with the search of Groups I, II and IV, their searches are not coextensive of each other. In this particular instance, a search of Group I is not coextensive with a search of Group III, since Group I requires a search for methods of regulating transcription not claimed in Group III, a search of Group II is not coextensive with a search of Group III, since Group II requires a search for a search for methods

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of regulating transcription and a transcriptional repressor domain not claimed in Group III, a search of Group IV is not coextensive with a search of Group III, since Group IV requires a search for a transcriptional repressor domain not claimed in Group III. Accordingly, claims 7-8, 10-15 and 17-22 are examined on the merits in the instant office action, and claims 1-6, 9, 16 and 23 are withdrawn from consideration as being directed to nonelected inventions.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

Initialed and dated copies of Applicant's IDS forms 1449, filed December 14, 2001, November 7, 2001, January 28, 2002, February 14, 2002 and March 12, 2002, Paper Nos. 8, 9, 11, 13 and 14, are attached to the instant Office action.

Claim Rejections - 35 USC § 112

Claims 7-8, 10-15 and 17-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a written description rejection.

The claims are drawn to a plant host cell or transgenic plant comprising a polynucleotide encoding an engineered zinc finger polypeptide and an endogenous or heterologous target DNA sequence to which the zinc finger polypeptide binds, said target DNA sequence being operably

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linked to a coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence.

The specification describes a plant host cell or transgenic plant comprising a polynucleotide of SEQ ID NO:4 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP16 transcriptional activator domain, and a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous GFP or RFP coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence (page 51-68 and Figures 3 and 4). The specification also describes a plant host cell or transgenic plant comprising a polynucleotide of SEQ ID NO:5 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP64 transcriptional activator domain, and a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous GFP or RFP coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence (page 51-68 and Figures 3 and 4). This does not constitute a substantial portion of the genus that comprises polynucleotides encoding engineered zinc finger polypeptides which regulate the transcription of coding sequences operably linked to their respective zinc finger polypeptide target DNA sequences. The claimed genus encompasses a multitude of different nucleotide sequences, including those yet to be discovered. The disclosure of only one polynucleotide encoding a zinc finger polypeptide which regulates the transcription of coding sequences operably linked to its zinc finger polypeptide target DNA sequence does not provide an adequate description of the claimed genus, and in view of the level of knowledge and skill in the art, one

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skilled in the art would not recognize from the disclosure that the Applicant was in possession of the genus that comprises polynucleotides encoding engineered zinc finger polypeptides which regulate the transcription of coding sequences operably linked to their respective zinc finger polypeptide target DNA sequences (see Written Description Guidelines, Federal Register, Vol. 66, No. 4, January 5, 2001, pages 1099-1111).

Claims 7-8, 10-15 and 17-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a transgenic plant or plant cell comprising a polynucleotide of SEQ ID NO:4 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP16 transcriptional activator domain, and a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous coding sequence, and while being enabling for a transgenic plant or plant cell comprising a polynucleotide of SEQ ID NO:5 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP64 transcriptional activator domain, and a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous coding sequence, does not reasonably provide enablement for a transgenic plant or plant cell comprising a polynucleotide encoding any engineered zinc finger polypeptide fused to any biological effector domain or transcriptional activator domain and any target DNA sequence to which the zinc finger polypeptide binds. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

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The claims are drawn to a plant host cell or transgenic plant comprising a polynucleotide encoding an engineered zinc finger polypeptide fused to a biological effector domain or a transcriptional activator domain and a heterologous target DNA sequence to which the zinc finger polypeptide binds, said target DNA sequence being operably linked to a heterologous coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence.

The specification discloses cotransformation of *Arabidopsis* and onion plants with a construct comprising a polynucleotide of SEQ ID NO:4 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP16 transcriptional activator domain, and a construct comprising a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous GFP or RFP coding sequence (pages 60-67). The specification also discloses cotransformation of *Arabidopsis* and onion plants with a construct comprising a polynucleotide of SEQ ID NO:5 encoding a fusion of four fingers of a TFIIIA zinc finger polypeptide, three fingers of a Zif268 zinc finger polypeptide, and a VP64 transcriptional activator domain, and a construct comprising a polynucleotide comprising one or four heterologous target sequences of SEQ ID NO:7 operably linked to a heterologous GFP or RFP coding sequence (pages 60-67). GFP and RFP reporter gene expression was detected in plants cotransformed with the zinc finger fusion construct and the reporter construct, as compared to plants transformed with the reporter construct alone (Figure 5). The specification does not disclose the effect of transforming plants with polynucleotides encoding other types of zinc finger polypeptide domains fused with other types of transcriptional activator domains. The specification also does not disclose the effect of

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any zinc finger fusion construct on the transcription of any coding sequence operably linked to an endogenous target sequence.

While one skilled in the art could readily transform a plant cell with a polynucleotide encoding an engineered zinc finger polypeptide such that it would be expressed in a transformed cell, it would require undue experimentation for one skilled in the art to determine which polynucleotide to express and at what level, because the effect of expressing an engineered zinc finger polypeptide on the transcription of a coding sequence operably linked to a target sequence is unpredictable. The specification does not provide sufficient guidance for one skilled in the art to determine which polynucleotide to express and at what level, because the specification discloses only one polynucleotide encoding an engineered zinc finger polypeptide that regulates the transcription of a coding sequence operably linked to a target sequence. The term "engineered zinc finger polypeptide" encompasses a plethora of structurally and functionally distinct proteins, as a large number of non-engineered proteins native to both plant and animal species have zinc finger motifs. That any engineered zinc finger polypeptide would function to regulate the transcription of a coding sequence operably linked to a target sequence would be unpredictable, as the zinc finger polypeptide would have to be engineered in such a way as to retain a structural conformation able to perform the desired function. Furthermore, that any engineered zinc finger polypeptide would function to regulate the transcription of an endogenous coding sequence operably linked to a target sequence would be unpredictable, as not all zinc finger polypeptides would have a cognate target sequence in a plant cell.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7-8, 10-15 and 17-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7-8 are indefinite in the recitation of "engineered". It is unclear in what way the zinc finger polypeptide is "engineered", as a polypeptide may be engineered in many different ways, such as by cloning of the polynucleotide that encodes the polypeptide, by mutating the cloned polynucleotide that encodes the polypeptide, by fusing the cloned polynucleotide with polynucleotides that encode other polypeptides, etc.

Claims 14 and 21 are indefinite in the recitation of "biological effector domain". It is unclear what biological property is affected by the effector domain, as a polypeptide domain may affect many different types of biological properties, such as transcription, translation, phosphorylation, etc.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7-8, 10-12 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Putterill et al. (Cell, Vol. 80, 847-857, March 4, 1995).

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The claims are drawn to a plant host cell or transgenic plant comprising a polynucleotide encoding an engineered zinc finger polypeptide and an endogenous target DNA sequence to which the zinc finger polypeptide binds, said target DNA sequence being operably linked to a coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence.

Putterill et al. teach an *Arabidopsis* plant host cell and transgenic *Arabidopsis* plant comprising a polynucleotide encoding a genetically engineered *Arabidopsis* CONSTANS zinc finger polypeptide (page 849 column 1 first and second full paragraphs and Figure 2). Although Putterill et al. do not explicitly teach the identity of any endogenous target DNA sequence operably linked to a coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence, such endogenous target DNA sequences are necessarily inherent in the *Arabidopsis* plant host cells and transgenic *Arabidopsis* plants taught by Putterill et al., as the native CONSTANS zinc finger polypeptide is a transcription factor and the plant host cells and plants would inherently possess endogenous target DNA sequences operably linked to coding sequences whose transcription is regulated by the binding of the CONSTANS polypeptide. Furthermore, the alteration in the flowering time phenotype of the transgenic plants taught by Putterill et al. indicates that expression of the CONSTANS transgene results in the regulation of the transcription of an endogenous coding sequence.

Claims 7-8, 10-11, 13-15, 17-18 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoyama et al. (The Plant Journal, 1997, Vol. 11, No. 3, 605-612, Applicant's IDS).

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The claims are drawn to a plant host cell or transgenic plant comprising a polynucleotide encoding an engineered zinc finger polypeptide fused to a biological effector domain or a transcriptional activator domain and a heterologous target DNA sequence to which the zinc finger polypeptide binds, said target DNA sequence being operably linked to a heterologous coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence.

Aoyama et al. teach a tobacco plant host cell and transgenic tobacco plant comprising a polynucleotide encoding a genetically engineered GAL4 zinc finger polypeptide fused to a VP16 biological effector domain and a GR transcriptional activator domain, and a heterologous GAL4 UAS target DNA sequence to which the zinc finger polypeptide binds, said target DNA sequence being operably linked to a heterologous LUC coding sequence whose transcription is regulated by binding of the zinc finger polypeptide to the target sequence (page 605 column 2 last paragraph through page 606 column 2 first full paragraph and Figure 1; page 608 Figure 3).

Remarks

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (703) 605-1210. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (703) 306-3218. The fax phone numbers for the

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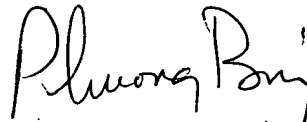
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organization where this application or proceeding is assigned are (703) 308-4242 for regular communications and (703) 308-4242 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

CC

October 15, 2002


PHUONG T. BUI 10/19/02
PRIMARY EXAMINER